

What is claimed:

1. Means for monolithically forming one-piece, low profile, reflective pavement marker comprising:

a substantially hollowed structural body with two parts, each of said parts having an arcuate top surface, one inclined planar face with multiple reflective cells, said reflective cells are formed in two rows, each of said cells is integrally includes an inside cell like area [s] open [, in two rows, ]within hollow cavity air gaps immediately beneath said reflective cells, each part further includes two arcuate sides with abrupt vertical ends, a backside with the open ends of one row of said hollow cavity air gaps, and a planar base surface that includes an extended portion beyond the front and side [s] peripheries [y] of said part, said base surface also includes the open ends of the second row of said hollow cavity air gaps, said reflective cells can have either rectangular, hexagonal or rhomboid [or circular] shapes, said pavement marker [forming means] can be formed from a [utilize] high impact resistant polymeric material [for said forming means], said pavement marker [forming means] can be injection molded in one transparent color or in two stage color process;

element means for retro-reflection associated with marker forming means [for] integrally [forming] protruding from said inside surfaces of said reflective cells within said hollow cavity air gaps, said element means provide a plurality of cube-corner reflective elements on said designated inside cell like areas [within the inside surfaces of said reflective cells defined by said hollow cavity air gaps], thereby [providing said marker forming means the cube corner reflective elements needed to] facilitate retro-reflectivity of light from oncoming vehicles, said cube corner reflective elements can be [of the] selected from various micro cube sizes or the standard size commonly used, [ said cube corner reflective elements are protruding freely within said hollow cavity air gaps; ] [means for injection molding the] said two parts integrally connected with thin ties and having at least one beaded backside for sonic welding said two parts; and

[load carrying] interior wall means for structural support disposed rearward starting at the periphery of the designated reflective cell like areas and about .05 to .10 inch bellow the exterior of said inclined planar reflective face,

thereby defining said hollow cavity air gaps beneath said cube corner reflective elements, providing structural support for the low profile reflective pavement marker and providing the ejection space needed during injection molding process used for fabricating said marker [forming means], said hollow cavity air gaps each having a centerline that forms an angle of about 50 to 90 [75] degrees with respect to the corresponding planar base surface of said part, said hollow cavity air gaps separated from each other by said wall means, said wall means having outwardly tapered surfaces [starting at about .05 to .10 inch bellow the exterior, inclined, reflective face of said part] ; and

means for abrasion resistant coating the exterior surface of said reflective pavement marker with [either a hard carbon, silicon dioxide, or aluminum oxide film, said coating means utilizing a suitable plasma enhanced] a chemical film utilizing various [vapor] deposition method. [, or ion beam sputtering method. ]

2. The means for monolithically forming one-piece, low profile, reflective pavement marker as defined in claim 1, wherein the open ends of hollow cavity air gaps at the planar base surface can be capped and sealed with a corresponding size and shape polymeric thin [cap] plate, said [cap] plate having textured and grooved exterior surface and beaded or textured interior surface.
3. [The means for monolithically forming one-piece, low profile reflective pavement marker as defined in claim 1, wherein the exterior surface of said pavement marker can be coated with an adhesion enhancing buffer coat of carbon with gradual inducement of hydrogen sloped in concentration, a second, hard, abrasion resistance, carbon film can be formed, using the ion beam sputtering chamber]

4. Means for monolithically forming a one-piece reflective pavement marker comprising:

a substantially hollowed structural body, said marker body having a spherical top surface with multiple, parallel, raised ridges, two recessed sides with near vertical grip areas, a planar base surface with textured discontinuous grooves, said spherical top surface includes multiple reflective cells, [some of] said reflective cells integrally having planar inclined outside surfaces, said reflective cells having [designated] planar inside [areas] surfaces open within hollow cavity air gaps immediately beneath said reflective cells, said reflective cells can have either rectangular, hexagonal, or rhomboid shapes, said spherical top surface integrally includes multiple, parallel raised ridges, said one-piece pavement marker [forming means] can [utilize] be fabricated from high impact resistant polymeric material, [for said forming means,] said pavement marker forming means can be injection molded in one transparent color or in two stage multi-color process;

means associated with marker forming means for integrally forming, multiple cube-corner reflective elements [on] within the inside surface of said designated cell like areas [within the inside surface] of said spherical top surface, said cube corner reflective elements protruding freely within [the] said hollow cavity air gaps, thereby providing the means to facilitate retro reflectivity of light from oncoming vehicles, said cube corner reflective elements can be of the micro cube sizes or the standard sizes;

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[load carrying] interior wall means for structural support disposed rearward starting at the periphery of [the] said designated reflective cell like areas and about .05 to .15 inch bellow the exterior spherical top surface, thereby defining said hollow cavity air gaps beneath said cube corner reflective elements, [providing structural support for the spherically shaped marker] and providing the ejection space needed during injection molding process used for said pavement marker [forming means],

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said hollow cavity air gaps each having a centerline that forms an angle of about 50 to 90 [75] degrees with respect to the corresponding planar base surface of said structural body,

said hollow cavity air gaps having open ends at the planar base surface, said hollow cavity air gaps separated from each other by said wall means, said wall means having outwardly tapered surfaces. , said wall means either having walls with textured interior surfaces, smooth surfaced walls, walls with arcuate surfaces, or walls with small spherical dots.

[5. The means for monolithically forming one-piece reflective pavement marker as defined in claim 4, wherein the open ends of hollow cavity air gaps at the planar base surface can be capped and sealed with a corresponding size and shape polymeric thin cap, said cap having textured and grooved exterior surface and beaded or textured interior surface for sonic welding to a designated recessed area within said planar base surface of said spherically shaped marker. ]

[6. The means for monolithically forming one-piece reflective pavement marker as defined in claim 4, wherein the exterior surface of said pavement marker can be coated with an abrasion resistant hard carbon film or aluminum oxide film utilizing one of the plasma enhanced chemical vapor deposition methods or ion beam sputtering methods, said coating can be in one or two stage carbon layers, said marker exterior surface can be chemically cleaned and or ion etched prior to said hard carbon film coating for adhesion enhancement.]

7. A method of forming a reflective pavement marker monolithically including multiple of cube corner reflective elements comprising the steps of:

a) providing tooling means which allow an injection molding of said reflective pavement marker integrally including the cube corner reflective elements, said tooling means can mold said pavement marker in one stage or two stage color injection molding cycle;

b) providing the load carrying interior walls an angular means defining multiple hollow cavity air gaps which allow integrally forming the cube corner reflective elements within designated planar interior cells, said cube corner reflective elements protruding freely inside said hollow cavity air gaps in said pavement marker, said hollow cavity air gaps having centerlines inclined about 50 to 90 [75] degrees with respect to the planar base surface of said pavement marker; and

c) provide the means for applying an abrasion resistant hard coat to said pavement marker outside surface utilizing various chemical film deposition methods, plasma enhanced chemical vapor deposition, [means or] ion beam sputtering [means] or reactive sputtering methods [to coat the exterior of said pavement marker surface with] to coat hard, abrasion resistance film, [carbon film, silicon dioxide, or aluminum oxide film,] said coating means can utilize any hybrid process in chemical vapor deposition chamber, such as, radio frequency plasma decomposition from a gas, such as normal butane or other gases, said plasma can be excited using an electromagnetic alternating fields, said coating means can also utilize ion beam sputtering process which can provide one or two stage gradual coating, said coating can have an adhesive enhancing buffer coat on the pavement marker surface [and then the] followed by hard carbon coat thereafter.

whereby said reflective pavement marker will be monolithically formed including said cube corner reflective elements with abrasion resistant carbon coated exterior surface.